

22 March 1967

25X1A To: [redacted]

Dear Ivan,

25X1A As you know, [redacted] has been using full pressure suit helmets that have an oral-nasal oxygen mask installed in order to permit him to fly with the face visor up at all times. For various reasons, of which you are aware, he prefers this system to any other and wishes to retain it as his personal equipment whenever it is necessary to fly with the pressure suit in our aircraft. Since his primary flight activities these days concern the Edwards-Palmdale area, we would like you to maintain all of his equipment for him in the future; we will not retain any of his personal equipment at any other base. If flights are required some place other than the Edwards-Palmdale area, he would take his gear with him from your shop.

The following data has been primarily compiled by [redacted] and is being passed on to you in the event that any of this information may not have been available.

25X1A

There have been six of these helmets made which are designated as GN-ACS-1621 Phase II helmets. Four of these are in use and two are still available for another pilot to use in evaluation or test work.

25X1A [redacted] has in his possession two helmets that are listed as GN-ACS-1621 Phase II helmets. This particular helmet was ordered by the customer as an evaluation item to eliminate reflections from the gold plated heated visors presently used on all standard GN-ACS-880 full pressure helmets. To my knowledge, the GN-ACS-1621 Phase II helmet is still an evaluation item, as only two pilots, [redacted] and one other are the only ones to replace their standard GN-ACS-880 full pressure helmets with the Phase II GN-ACS-1621 mask helmet. The GN-ACS-1621 helmet has advantages over the standard helmet because the visor remains in the up position, eliminating reflections from the gold plated visor. Also, the two pilots often remarked about the added cooling from the suit vent air passing up through the suit neck ring past their face.

25X1A

The GN-ACS-1621 helmets are fitted with a counter balance spring assembly (GN-A2840) which adds to the closing of the visor under "G" forces, or if the pilot had to leave the aircraft in an inverted position. All ACS-1621 helmets have aneroid operated visors and are scheduled

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to close between 29,000 and 31,000 feet which is at least 3,000 feet before the aneroid in the suit controller functions.

The ACS-1621 Phase II helmet can be used with either an S970 (rear entry) suit assembly, which [ ] has two, or an S901 "U" entry suit assembly.

25X1A

One of [ ] Phase II helmets, (Serial Number 265), is not standard with the other existing five helmets of this type. This particular helmet has the original plumbing which connects the two internal oxygen hoses into the helmet manifold. This type of connector is very comfortable as it does not have a 3-1/2 inch long rigid hose connection in the neck ring area. This rigid portion of the hose interferes with head mobility and causes some discomfort in flight. The other five helmets were changed to put the hose connection in the neck area because of a disconnect that occurred at one time during suiting-up [ ]. This is readily avoided by making the proper hose to manifold connection as must be accomplished in several other areas during suit donning. We would like to have [ ] other helmet converted back to this internal manifold connection so that all of his equipment is the same. We further believe that the other four helmets should be made the same since pilot comfort is directly involved and since there is no reliability problem.

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Two other non-standard items on [ ] helmet, Serial Number 265, are the two helmet pressure taps ACS-C1311, used to monitor suit and face or mask cavity differential pressure as the Subject is being tested before a flight. This item was proven to be unsafe for flight, since it was found that due to the high profile of the ACS-C1311 pressure tap, it could be struck by a piece of parachute hardware and spun from the helmet. At a later date, the David Clark personnel static tested the entire assembly and found that the suit would not remain pressurized with a pressure tap missing. We were led to believe that if ejection occurred at a high altitude, the pilot would be in serious trouble. We were then directed to remove all ACS-C1311 pressure taps from all full pressure helmets and replace them with flush mounted GN-P-3399 type pressure taps.

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There is a disadvantage with the flush mounted GN-P-3399 type pressure taps in that they must be removed to make the pressure helmet check and then reinstalled to seal up the tap. This is done in the cockpit prior to flight and the plugs being very small, could be dropped and thus fall below the seat in the cockpit. David Clark should be advised to make a new pressure tap device for the helmets, such that nothing is removable that could be dropped in the cockpit, but is also flush so that it can not be damaged by being struck by any external object and thus permit the helmet to lose pressure. In the meantime, the only pressure taps that should be used are the GN-P-3399 type and we would like these to remain installed on [ ] helmets.

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When the ACS-1621 Phase II helmet is used with either an S970 or an S901 suit assembly, a neck dam GN-A2797 must be installed in the neck ring area of the suit. The neck dam normally remains loose around the Subject's neck to allow adequate vent and comfort for the Subject. The neck dam can be drawn tight by means of a draw string that attaches to the pilot's mask with a snap. In event the Subject had to eject over water, he should draw his neck dam tight before contact with the water as part of his over water ejection procedures. This would prevent water entering the suit through the helmet.

You will note another non-standard modification in [ ] helmet which we call the [ ] suspension system. You are probably well aware of this type of modification. We like it very much from a comfort and communications standpoint and highly recommend it for use in all of these full pressure suit helmets.

To pre-flight or test this helmet for any reason, you will follow the same procedures as testing an 880 type helmet. There is one change in the test plate used in the mask. The nomenclature and number for this item is GN-LJ-D1125 plate, testing, mask.

NOTE: When testing the GN-ACS-1621 Phase II helmet either in pre-flight, subject test or post-flight, always test the helmet with the visor in the closed position so the complete oxygen system is functioning while the test is being performed.

One other test that should be made at least every thirty days is the function of the aneroid operated visor in a chamber at altitude. The aneroid should allow the visor to close between 29,000 and 31,000 feet. After the test, the aneroid can easily be re-armed manually.

A number of spare parts used only on Phase II helmets should be kept in stock and installed only by experienced personnel. Enclosed are thirty day periodic and annual IRAN forms that we presently use, which cover the testing and inspection of all David Clark pilot's protective assemblies, including [ ]

Best regards,

ANNUAL IRAN SUIT ASSEMBLY

PAGE 1

ASSEMBLY NO. \_\_\_\_\_

DATE INSPECTED \_\_\_\_\_

SIGNATURE \_\_\_\_\_

HELMET ASSEMBLY

- A. OXYGEN SYSTEM PLUMBING STRESS TEST \_\_\_\_\_ @125 PSI FOR 2 MINUTES
- B. OXYGEN SYSTEM LEAK RATE \_\_\_\_\_ @70 PSI \*\*\*\*\*0 LEAK
- C. HELMET SHELL LEAK RATE \_\_\_\_\_ @3.5 PSI 700 cc/m MAX.
- D. FACE BARRIER LEAK RATE WITH EXHALATION VALVE \_\_\_\_\_ 400 cc/m MAXIMUM LEAK RATE
- E. PNEUMATIC SEAL BLEED DOWN TIME. NO 1 \_\_\_\_\_ NO2. \_\_\_\_\_ BOTH \_\_\_\_\_ 45-60 SECONDS
- F. LBNS RESISTANCE TEST, UNPRESSURIZED \_\_\_\_\_ PRESSURIZED \_\_\_\_\_ 20.3 +- 3.6 OHMS
- G. COMMUNICATION TEST \_\_\_\_\_
- H. ON PHASE 11 HELMETS HAVE ANEROID FIRED IN CHAMBER AND RECORD \_\_\_\_\_ MAX. 31,000

BASIC SUIT TEST.

- A. BASIC SUIT STRESS TEST, WITH HELMET AND GLOVES TILL RELIEF VALVE ACTUATES \_\_\_\_\_
- B. RELIEF VALVE TEST, LEFT \_\_\_\_\_ RIGHT \_\_\_\_\_ @4 TO 5 PSI
- C. BASIC SUIT LEAK RATE \_\_\_\_\_ @ 3.5 PSI 850 cc/m MAX.

FLOATATION GARMENT TEST.

- A. INFLATE GARMENT TO 12" H2O FOR 10 MINUTES DROP TO 11" H2O \_\_\_\_\_
- B. LEAVE INFLATED FOR 1 HOUR. MUST NOT LOOSE OVER 3" H2O IN THAT HOUR \_\_\_\_\_

SUIT ASSEMBLY PRESS TO TEST

- A. SYSTEM 1. MAXIMUM PRESSURE MMHG \_\_\_\_\_ 110 +- 10 MMHG
- DIFFERENTIAL INCHES \_\_\_\_\_ 1.0 TO 1.5 H2O
- LEAK RATE CC/M \_\_\_\_\_ 1500 cc MAXIMUM
- B. SYSTEM 2. MAXIMUM PRESSURE MMHG \_\_\_\_\_
- DIFFERENTIAL INCHES \_\_\_\_\_
- LEAK RATE CC/M \_\_\_\_\_ 1500 cc MAXIMUM
- C. COMPLETE OXYGEN SYSTEM LEAK RATE UNPRESSURIZED \_\_\_\_\_ 600 cc MAXIMUM

PAGE 2.

ANNUAL IRAN INSPECTION

HELMET

- A. INSPECT CLOSING OF BOTH SUNSHADE AND CLEAR VISORS AND OPERATION OF LEFT HAND BEARING \_\_\_\_\_
- B. CLEAN BOTH VISORS AND CHECK AND REMOVE SCRATCHES IF APPLICABLE \_\_\_\_\_
- C. INSPECT FACE HEAT WIRING \_\_\_\_\_
- D. INSPECT COMMUNICATION WIRING FOR SOLID CONNECTIONS BOTH SOLDER AND SCREW TYPE \_\_\_\_\_
- E. INSPECT FACE SEAL REPLACE IF NECESSARY \_\_\_\_\_
- F. INSPECT HELMET RACE , AND WIPER SEAL, CLEAN OR REPLACE \_\_\_\_\_
- G. INSPECT HELEMT HOSES FOR WEAR, HAVE REPLACED IF NEEDED \_\_\_\_\_
- H. INSPECT WIND-UP KNOB FOR LOOSE SCREWS AND OPERATION OF TAKE UP \_\_\_\_\_

RESTRAINT

- A. INSPECT GARMENT FOR WEAR, TEARS, AND SMOOTHNESS OF ALL ZIPPERS \_\_\_\_\_
- B. INSPECT ALL SCREWS FOR BURRS AND TIGHTNESS ( TORQUE ALL SCREWS PER SPEC. \_\_\_\_\_
- C. INSPECT SUIT HALF NECK RING DONNING CLIP, LOCKING LATCH, STATIC SEAL \_\_\_\_\_
- D. INSPECT PRESSURE SEALING ZIPPERS, CLEAN AND LUBRICATE \_\_\_\_\_
- E. INSPECT SUIT HALF GLOVE DISCONNECTS. REPLACE LEFT AND RIGHT "O" RINGS \_\_\_\_\_
- F. INSPECT HOLD-DOWN ASSEMBLY. INSPECT HOLD-DOWN LANYARD FOR WEAR \_\_\_\_\_

GLOVES.

- A. INSPECT HARDWEAR SCREWS FOR TORQUE. REMOVE AND REPLACE SCREWS WITH BURRS \_\_\_\_\_
- B. INSPECT STITCHING, PALM RESTRAINTS, TAPING AND ZIPPERS \_\_\_\_\_
- C. INSPECT CURB DATE OF GLOVE BLADDERS AND REPLACE IF DUE \_\_\_\_\_

OUTER GARMENT.

- A. INSPECT ALL ZIPPERS, FLAPS, POCKETS AND STITCHING \_\_\_\_\_
- B. INSPECT ALL SNAPS FOR TIGHTNESS. REPLACE IF NEEDED \_\_\_\_\_
- C. INSPECT FLOATATION GARMENT LACING, WEIGHT OF CO2 BOTTLE, RELACE ALL "O"  
RINGS AND RESAFETY ACCUATOR WITH "B" THREAD. INSERT CO2 BOTTLE AND TORQUE  
WITH 60 LBS. LOCK IN PLACE WITH SAFETY SCREW.

VENT INPUT ASSEMBLY

- A. REPLACE FLAPPER VALVE AND "O" RING IN VENT INPUT ASSEMBLY \_\_\_\_\_
- B. INSPECT ALL SCREWS FOR BURRS. REPLACE IF NEEDED AND TORQUE ALL SCREWS. \_\_\_\_\_

SUIT ALTIMETER ( IF APPLICABLE )

- A. INSPECT ALTIMETER LENS FOR SCRATCHES OR CRACKS. REPLACE LENS IF NEEDED \_\_\_\_\_
- B. INSPECT AND TORQUE ALL SCREWS ON MOUNTING PLATE. \_\_\_\_\_

BOOTS

- A. INSPECT ZIPPERS, LACING AND PERMANENT ATTACHED SPURS IF APPLICABLE. \_\_\_\_\_
- B. POLISH BOOTS. \_\_\_\_\_

REMARKSHELMETRESTRAINTGLOVESOUTER GARMENTBOOTS

SIGNATURE OF INSPECTING TECHNICIAN \_\_\_\_\_

5970

PERIODIC INSPECTION S901 (E) DATE \_\_\_\_\_ SUIT ASSY \_\_\_\_\_ TECH \_\_\_\_\_

TYPE INSPECTION: 30 days elapsed time \_\_\_\_\_ 5 flights \_\_\_\_\_

1. Stress O<sub>2</sub> system to 125 PSI for 1 minute \_\_\_\_\_
2. O<sub>2</sub> system leak rate (garment unpressurized)  
Input pressure 70 PSI  
800 CC/M Max . . . . . BOTH SYSTEMS. . . . . \_\_\_\_\_ CC/M
3. Press-to-test Check  
System #1  
MAX Press 110 ± 10 MMHg. \_\_\_\_\_ MM  
Differential 1.0 - 1.5" H<sub>2</sub>O \_\_\_\_\_ "H<sub>2</sub>O  
Leak Rate 1800 CC/M Max \_\_\_\_\_ CCM  
System #2  
\_\_\_\_\_ MM  
\_\_\_\_\_ "H<sub>2</sub>O  
\_\_\_\_\_ CCM  
. . . . .
4. Stress suit assy to point at which relief valves "POP"  
1 Min duration (4.5 ± 0.5 PSI) . . . . . MAX \_\_\_\_\_ PSI  
MIN \_\_\_\_\_ PSI
5. Leak Rate @ 3.5 PSI - 182 MMHg MAX -2000 CC/M \_\_\_\_\_ CC/M
6. Lens Resistance, w/pressure, wo/pressure  
20.3 ± 3.6 OHMS . . . . . \_\_\_\_\_ OHMS
7. Anti-suffocation Bleed Rate  
30-60 ~~seconds~~ seconds . . . . . BOTH SYSTEMS . . . . . \_\_\_\_\_ SEC
8. Communications Check . . . . . \_\_\_\_\_
9. Visual Inspection . . . . . \_\_\_\_\_

PERIODIC VISUAL INSPECTION CHECK (Page 2)

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_

PERIODIC VISUAL INSPECTION

- |           |       |  |                |
|-----------|-------|--|----------------|
| HELMET    | A.    | Check closing of both visors and operation of latching knobs.                  | _____          |
|           | B.    | Clean both visors and check for scratches.                                     | _____          |
|           | C.    | Clean heater contacts.   | _____          |
|           | D.    | Check wiring and communications plug.  | _____          |
|           | E.    | Check face seal-OR MASK  | _____          |
|           | F.    | Check neck bearing torque.   | _____          |
|           | G.    | Check hoses for kinks, tightness, etc.   | _____          |
| RESTRAINT | D.    | Check Helmet GNR010 if APPLICABLE  |                |
|           | A.    | Inspect garment for wear, rips, tears, etc.                                    | _____          |
|           | B.    | Inspect all zippers.   | _____          |
|           | C.    | Check lacing of restraint cover.   | _____          |
|           | D.    | Check all screws for tightness.  | _____          |
|           | E.    | Check helmet disconnect; Back clip, O-ring, ring latch.                        | _____          |
|           | F.    | Forearm disconnect O-ring.   | _____          |
| GLOVES    | G.    | Helmet hold-down adjustment strap, cable, screws for tightness, Tru-Arc locks. | _____          |
|           | A.    | Check screws on flanges for tightness.   | _____          |
|           | B.    | Check stitching.   | _____          |
|           | C.    | Check palm restraints.   | _____          |
|           | D.    | Check zippers.   | _____          |
|           | E.    | Check taping on inside of disconnect.  | _____          |
|           | BOOTS | A.   | Check zippers. |
| B.        |       | Check lacing.  | _____          |
| C.        |       | Polish boots if needed.  | _____          |
| COVERALL  | A.    | Check all zippers and flaps.   | _____          |
|           | B.    | Check all snaps.   | _____          |
|           | C.    | Check flotation gear lacing.   | _____          |
|           | D.    | Weight flotation bottle.   | _____          |
|           | E.    | Check safety seal.   | _____          |
|           | F.    | Check Flotation Garment  | _____          |